

WHAT IS CLAIMED IS:

- 1 1. A process for the generation of low nanosized particles of one
2 or more metals or the combusted products thereof, comprising:
 - 3 a) providing a multi-element diffusion flame burner having a
4 plurality of combustible gas passageways and combusting gas
5 passageways arranged in a geometric array defining a
6 substantially planar burner surface, and optionally, one or a
7 plurality of spaced apart precursor supply passageways;
8 b) supplying non-premixed combusting gas to said combusting
9 gas passageways and non-premixed combustible gas to said
10 combustible gas passageways and igniting to form a primary
11 flame;
12 c) introducing a particle precursor into at least one of
13 (i) said combusting gas,
14 (ii) said combustible gas, or
15 (iii) said precursor supply passageways, and
16 d) recovering a nanosized combusted particle product.
- 1 2. The process of claim 1, wherein said precursor comprises at
2 least one volatile metal compound of a metal of groups 3 to 7, a transition metal, or
3 an inner transition metal.
- 1 3. The process of claim 1, wherein said precursor comprises a
2 volatile metal alkyl, metal alkoxide, metal hydride, metal halide, metal salt of an
3 organic carboxylic acid, metal glycolate, metal olefin complex, or a mixed metal
4 compound containing at least one metal and two or more alkyl, alkoxide, hydride,
5 halide, carboxylate, olefin, or glycolate moieties.
- 1 4. The process of claim 1, wherein said metal comprises silicon,
2 titanium, aluminum, zirconium, gold, silver, platinum, or tin.

1 5. The process of claim 1, wherein said nanosized particles have
2 a mean particle size of less than 50 nm.

1 6. The process of claim 1, wherein said precursor is an organic
2 tin compound and said nanosized particle product comprises one or more of Sn(0),
3 SnO, or SnO₂.

1 7. The process of claim 6, wherein said nanosized particle
2 product comprises Sn(0).

1 8. The process of claim 1, wherein at least one of said
2 combusting gas or said combustible gas is diluted with an inert gas.

1 9. An Sn(0) or SnO nanosized particle product, prepared by the
2 process of claim 1.

1 10. The process of claim 1, further comprising
2 d) altering the flame stoichiometry to vary the oxidation state of
3 said combusted product.